Forest Health Protection
Pacific Southwest Region

USDA

Date: July 19, 2011

To: Richard Elias, Assistant US Attorney

Subject: Rebuttal to report by expert witness Steven J. Day, re: United States v. Pacific Gas and Electric Company, et al., Case No. 2:09-CV-02811-GEB-EFB. (FHP Report No. N11-06)

Introduction

I have been requested by the US Attorney's office to provide comments regarding the June 17, 2011 report by Steven Day. It is important to note that Mr. Day's visit to the area was in April of 2011, almost seven years after the incident. In contrast, Dr. Dave Schultz and I visited the site and made our observations within a week after the fire. Many of the items in Mr. Day's reports have already been addressed in Dr. Schultz's and my previous reports (USDA Forest Service, Forest Health Protection Report No. N04-07, issued on August 4, 2004, and corrected by my letter to Patrick Brown on February 8, 2011 (FHP Report No. N-11-03), and Forest Health Protection Report No. N11-04, issued on June 17, 2011), and do not bear repeating here. However, several specific points in Mr. Day's report need to be addressed further.

Rebuttal Points

1. Mr. Day's conclusion that the subject Douglas-fir was only 75-feet tall immediately prior to the fire is wrong. As was stated in Dr. Schultz' and my 2004 report and my June 2011 report, while the pieces that were recovered account for 77 feet of the tree, there were additional pieces of the tree that we were unable to find. Contrary to what Mr. Day says in his report, the break at the distal end of the 68 feet, 6-inch-long section of the subject tree that was resting in Grouse Creek was fresh when we inspected it in 2004, indicating that an additional top section of the tree snapped off when it fell. In addition, the 18-inch difference between the 48-inch diameter at breast height of the subject trunk and the 30-inch diameter measurement that was obtained five feet from the proximal end of the piece that was resting in Grouse Creek, indicates that there were likely additional portions of the tree between the break at the top of the bole and the bottom of the long piece. LiDar evidence also indicates that the tree was between 95 and 110-feet tall at the time of the failure, otherwise the south phase of the power line would not have been hit.

2. Mr. Day states that: "...it is not usual nor customary for wood core samples to be taken by preinspectors on a tree suspected of having decay. Furthermore, taking core samples of a tree, especially if the tree is under stress, creates wounds which initiate the process of discoloration and decay of wood that further weaken the tree. If it is deemed necessary and appropriate, there are other techniques available to a

preinspector that are significantly less invasive and injurious than extracting a wood core with an increment borer. It would be prohibitive from a cost and time standpoint to "seek and discover", then perform a hazard tree assessment on every potential suspect tree, especially well outside the ROW, over thousands of miles of dense forest canopy."

The above statements are wrong or misleading in several respects. First, although there are several techniques available to assess internal decay, ranging from sounding with an axe or mallet, to probing or cutting with a knife or axe, to drilling into the tree with a long-bit drill or an increment borer, the inspector, Mr. Middleton, employed none of the above techniques. This was because he failed to visually inspect the tree, even though it was within striking distance of the power line. In addition, even if he had inspected the tree, he did not have any of the equipment necessary to perform any of the above assessments. As was stated in my report of June 17, 2011, the importance of having and using the proper tools to locate and assess decay and solid wood in potentially hazardous trees is referred to on pages 1-18 and 1-22 of the Power Line Fire Prevention Field Manual (2001). It is also discussed page 7 of the Handbook of Hazard Tree Evaluation for Utility Arborists (1993).

Use of an increment borer is particularly helpful because it allows one to assess the amount of sound wood in a tree relative to the amount of decay. Mr. Day correctly states that using an increment borer or other tools that create wounds can help initiate or exacerbate the process of decay. For this reason, increment borers or other invasive tools should only be used when the value of the information that will be gained is reasonably likely to be greater than the risk of possibly accelerating the decay process. The subject tree, which was within striking range of the power line, clearly had a large, easily visible basal fire scar, and the open exposed surface was completely rotten. Cutting, coring or drilling into the open face of the basal scar would not have hurt the tree any further, but would have indicated that the decay was extensive. If the tree not was immediately marked for removal at that point, further investigation using more invasive methods would have been clearly warranted to determine how much of a sound wood shell remained to hold the tree up. Under the circumstances at the Sims site, acquiring this information in order to prevent a fire would be far more important than risking possible future negative effects from the assessment technique.

In the last sentence of the above quote, Mr. Day states that it would be prohibitive from a cost and time standpoint to fully perform a hazard tree assessment on every potential suspect tree (every tree within striking distance of the power line). However, that is precisely what needs to be done. Because trees with a full crown of green leaves can still be highly defective, all trees within striking distance of significant targets must be evaluated. Page 23 of the International Society of Arboriculture (ISA) Utility Specialist Certification Study Guide (2002) drives home this point, stating that "As a guiding principle, any tree that might hit conductors or other equipment if it failed should be inspected and evaluated". In addition, page 4 of the Handbook of Hazard Tree Evaluation for Utility Arborists (1993) further states, "Inspect any tree that might be a target, even if it is off of the right-of-way."

In most cases, the assessment would entail a simple visual assessment of all sides of the tree. Additional assessment would only be needed if the visual inspection

revealed potential defects that required further investigation. The need to leave the ROW to accomplish this is discussed in both the Power Line Fire Prevention Field Manual (2001) and the Handbook of Hazard Tree Evaluation For Utility Arborists (1993).

3. Regarding preinspection protocols and guidelines for identifying hazard tree conditions in the field, Mr. Day states that "there are no strict or rigid models or formulas that are set forth or required in terms of how they should be applied to specific hazard tree conditions." As far as I know, this statement is correct. However, even though the decay/strength loss formulas that were developed by Wagener and others (as summarized in Matheny and Clark, 1994) are not to be applied rigidly, the subject tree did not come even close to meeting the "minimum safe standard" (Wagener's terminology) set by these formulas. For example, to meet "minimum safe standard" under Wagener's model, the subject tree would have needed 6.5 to 7-inches of sound wood around the entire diameter. By Mattheck et. al.'s formula (1992), the tree would have needed 8 inches of continuous sound wood. The subject tree had far less sound wood than that. In addition, since these models assume that the decay column is in the center of the tree with no openings to the outside, the presence of an opening in the subject tree makes the thickness of sound wood necessary for the subject tree to be considered safe even greater. Strength loss formulas are one of several measures that should be considered when evaluating trees for hazard.

4. In his report, Mr. Day states that "the only way to fully protect electric power lines from potentially hazardous trees is to summarily remove or top all trees within the target zone of the lines on a regular and constant basis. This, of course, would not be expedient, cost-effective, or environmentally sound." In essence, what Mr. Day is saying is that because the only way to completely protect a potential target from harm would be to remove all trees within striking distance, we should do nothing. However, hazardous trees can be identified, and the risk of accidental fire ignition or other accidents due to tree failure can be reduced to acceptable levels. As stated in the International Society of Arboriculture Utility Specialist Certification Study Guide (2002), "Failures are not random events. They usually result from a combination of identifiable defects and unfavorable conditions. Some failures appear random because the defects may not be evident at first, and it may take some investigation and analysis to determine the defect." In this case, for whatever reason the inspector failed to inspect the subject tree even though it was within striking distance of the power line. If he had, he would have readily identified the high defect potential from the advanced bole decay, and would have identified it as an obvious candidate for removal.

Materials Relied Upon

Clark, James R. and N.P. Matheny. 1993. A Handbook of Hazard Tree Evaluation for Utility Arborists. International Society of Arboriculture, Savoy, IL. 34p.

Day, S.J. 2011. Day & Associates report to Richard S. Linkert, Esq.- June 17, 2011. 8p. plus biography, publications, record of expert witness and listigation cases, and fee schedule.

Matheny, N.P. and J.R. Clark. 1994. A Photographic Guide To The Evaluation Of Hazard Trees In Urban Areas. International Society of Arboriculture, Champaigne, IL. 84p.

O'Callaghan, D.P. and D.L. Ham, eds. 2002. Utility Specialist Certification Study Guide. International Society of Arboriculture, Champaigne, IL. 84p.

Wagener, W.W. 1963. Judging hazard from native trees in California recreation areas: a guide for professional foresters. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, Berkeley, CA. Research Paper PSW-P1. 29p.

Wang, Philip. 2011. Momentum Engineering Corp. report to Richard M. Elias, Esq.- June 20, 2011. 15p.

/s/ Pete Angwin

Dr. Pete Angwin
Plant Pathologist
USDA Forest Service, Forest Health Protection
Northern CA Shared Service Area